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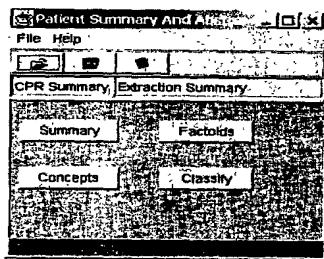
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(54) Title: PATIENT DATA MINING, PRESENTATION, EXPLORATION, AND VERIFICATION



(57) Abstract: The present invention provides a graphical user interface for presentation, exploration and verification of patient information. In various embodiments, a method is provided for browsing mined patient information. The method includes selecting patient information to view, at least some of the patient information being probabilistic, presenting the selected patient information on a screen, the selected patient information including links to related information (Fig. 3). The selected patient information may include elements, factoids, and/or conclusions. The selected patient information may include an element linked to unstructured information. For example, an element linked to a note with highlighted information may be presented (Fig. 4). Additionally, the unstructured information may include medical images and waveform information.

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**PATIENT DATA MINING, PRESENTATION,  
EXPLORATION, AND VERIFICATION**

**Cross Reference to Related Applications**

This application claims the benefit of U.S. Provisional Application Serial No. 60/335,542, filed on November 2, 2001, which is incorporated by reference herein in its entirety.

**Field of the Invention**

The present invention relates to organization and review of data, and, more particularly to a graphical user interface for presentation, exploration and verification of patient information.

**Background of the Invention**

The information environment faced by physicians has undergone significant changes. There is much more information available, in more formats than ever before, competing for the limited time of physicians. Although the information age is slowly transforming this landscape, it has not yet delivered tools that can alleviate the information overload faced by physicians.

Currently, many health care organizations have started to migrate toward environments where most aspects of patient care management are automated. However, health care organizations

with such information management systems have tended to maintain information in a myriad of unstructured and structured data sources. It may still be necessary to access numerous different data sources, each with its own peculiar format.

In view of the above, it would be desirable and highly advantageous to provide new graphical tools for presentation, exploration and verification of patient information.

#### Summary of the Invention

The present invention provides a graphical user interface for presentation, exploration and verification of patient information.

In various embodiments of the present invention, a method is provided for browsing mined patient information. The method includes selecting patient information to view, at least some of the patient information being probabilistic, presenting the selected patient information on a screen, the selected patient information including links to related information. The selected patient information may include raw information extracted from various data sources for the patient (hereinafter referred to as 'elements') or conclusions drawn therefrom. This information may be derived from various data sources.

The selected patient information may include an element linked to unstructured information. For example, an element

linked to a note with highlighted information may be presented. The highlighted information may refer to information used to derive the element. Additionally, the unstructured information may include medical images and waveform information.

The selected patient information may also be derived from structured data sources, such as a database table.

The selected patient information may include a document with links to elements associated with the document.

The selected patient information may include patient summary information.

The patient information presented to a particular user may depend on the identity or role of the user. For instance, a physician may be interested only in a high-level view of the disease (at least initially) and be presented with the most relevant conclusions drawn from the entire patient record.

Another option is to display all the patient information (every element and derived conclusion) but to sort this list in order of decreasing relevance to the disease.

These and other aspects, features and advantages of the present invention will become apparent from the following detailed description of preferred embodiments, which is to be read in connection with the accompanying drawings.

#### Brief Description of the Drawings

FIG. 1 shows an exemplary data mining framework for mining structured clinical information;

FIG. 2 shows an exemplary main browser screen;

FIG. 3 shows an exemplary options screen;

FIG. 4 shows an exemplary summary frame screen;

FIGS. 5 and 6 show exemplary verification screens;

FIGS. 7 and 8 show exemplary exploration screens;

FIGS. 9 and 10 show exemplary results of extraction from a structured data source; and

FIG. 11 to 13 show exemplary presentation of patient summary information.

#### Description of Preferred Embodiments

FIG. 1 illustrates an exemplary data mining framework as disclosed in "Patient Data Mining," by Rao et al., Attorney Docket No. 2001P20906US01, copending U.S. Patent Application Serial No. 10/\_\_\_\_,\_\_\_\_, filed herewith, which is incorporated by reference herein in its entirety.

As illustrates in FIG. 1, an exemplary data mining framework for mining high-quality structured clinical information includes a data miner 150 that mines information from a computerized patient record (CPR) 110 using domain-specific knowledge contained in a knowledge base (130). The data miner 150 includes components for extracting information from the CPR 152, combining all available evidence in a

principled fashion over time 154, and drawing inferences from this combination process 156. The mined information may be stored in a structured CPR 180.

The extraction component 152 deals with gleaning small pieces of information from each data source regarding a patient, which are represented as probabilistic assertions about the patient at a particular time. These probabilistic assertions are called *elements*. The combination component 154 combines all the elements that refer to the same variable at the same time period to form one unified probabilistic assertion regarding that variable. These unified probabilistic assertions are called *factoids*. The inference component 156 deals with the combination of these factoids, at the same point in time and/or at different points in time, to produce a coherent and concise picture of the progression of the patient's state over time. This progression of the patient's state is called a *state sequence*.

FIG. 2 illustrates an exemplary main browser screen 200 for browsing mined patient information. The exemplary main browser screen 200 includes a run state selector 202, a patient selector 204, and an enter button 206.

In operation, a user interacting with the main browser screen 200 enters a patient identifier using the patient selector 204 and a data mining run state using the run state selector 202. The user then clicks on the enter button 206 to

cause the selected patient identifier and run state to be input.

The data mining run state can include a particular run cycle (e.g., run date, time) that patient medical records were mined. When information is retrieved, it can include only information current as of that point.

Referring to FIG. 3, an exemplary options screen 300 is illustrated. The options screen 300 may include a plurality of input buttons, each input button for displaying a level of information. For example, the user may click on an input button to select summary information. FIG. 4 illustrates the result of selecting summary information from the options screen 300. As shown in FIG. 4, a summary of a particular patient information is presented. This summary includes all elements, documents, and tests for the patient relating to glycemic control, which is the view of the patient record presented to the particular user.

Advantageously, the patient information presented to a particular user may depend on the identity or role of the user. For example, a cardiologist may be presented with a different view of the data than an oncologist. Similarly, a physician may be presented with information different from that of a nurse or administrative employee. By presenting different views of the patient information, the user can more effectively make use of information that he or she is interested in.

Another option is to display all the patient information (every element and derived conclusion) but to sort this list in order of decreasing relevance to the disease. For instance, one patient's most relevant item may be his abnormal test results, while another patient whose test results are normal may have his family history of cancer be the most relevant item.

Referring to FIG. 5, an exemplary verification screen is illustrated. This screen allows a user to drill down an element to its underlying source. In this case, the element "STTAbn; Value: true, 0.8" has been selected, causing a physician note to be displayed in the right-hand portion of the screen. The highlighted portion of the physician note indicates the data from which the element was derived. In this case, it was concluded that there is an 80% probability that the patient's ECG showed ST-T wave abnormalities. FIG. 6 illustrates drilling down of another element, "STTabn; Value: false, 0.7", that contradicts the element shown in FIG. 5. In this case, it was concluded that there is an 70% probability that the patient's ECG showed ST-T wave abnormalities. A user may use the verification screen to verify the conclusions inferred from the underlying data sources.

Although FIGs. 5 and 6 show that the underlying data sources are physician notes, it should be appreciated that the data sources could take other forms. For example, the elements may be derived from (and linked to) medical images,

waveforms, and structured information (e.g., information contained in a database).

Referring to FIG. 7, documents may be displayed to the user. In this case, the user selected a physician note written by Emergency Room (ER) personnel. Two separate elements were derived from information contained in this document. FIG. 8 shows another document displayed on the exploration screen. As illustrated, this document includes fourteen elements in six categories.

FIGs. 9 and 10 illustrate patient information extracted from structured data sources. In particular, FIG. 9 shows lab results for a particular patient. As depicted, the lab results include a date, time, test name, and measurement value. FIG. 10 shows various medications administered to the patient. This information includes a drug name, date, dosage, and price information. The information obtained from structured data sources may have been converted into standardized units, where appropriate.

FIGs. 11 to 13 illustrate exemplary patient summary screens. FIG. 11 shows summary results for 'BGLUT' (blood glucose level). As shown, various summary information is presented to the user. Likewise, FIG. 12 shows summary results for "TCPL". As shown in FIG. 13, patient summary information related to various facets of glycemic control is presented.

While the exemplary screens use several selection menus and buttons, it should be appreciated that the selection of various parameters such as the patient identifier, miner run state, documents, elements, categories, etc., can be accommodated using a variety of devices, such as a number of graphical user interface selection widgets, check boxes, buttons, list boxes, pop-up or drop-down marks, text entry boxes and the like, or any known or later developed interfaces that an operator can access. It should be appreciated that the various exemplary screens illustrated herein can also, or alternatively, include any device capable of presentation, exploration, and verification of mined patient information.

Although illustrative embodiments of the present invention have been described herein with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments, and that various other changes and modifications may be affected therein by one skilled in the art without departing from the scope or spirit of the invention.

WHAT IS CLAIMED IS:

1. A method for browsing mined patient information, comprising the steps of:
  - selecting patient information to view, at least some of the patient information being probabilistic;
  - presenting the selected patient information on a screen, the selected patient information including links to related information.
2. The method of claim 1, wherein the selected patient information includes one or more of raw information extracted from available data sources for the patient and conclusions drawn therefrom.
3. The method of claim 1, wherein the selected patient information is derived from unstructured data sources.
4. The method of claim 1, wherein the selected patient information includes an element linked to unstructured information.
5. The method of claim 1, wherein the selected information includes an element linked to a note with highlighted information.
6. The method of claim 4, wherein the highlighted information refers to information used to derive the element.
7. The method of claim 3, wherein the unstructured information includes one of free text, medical image information, and waveform information.

8. The method of claim 1, wherein the selected patient information is derived from structured data sources.
9. The method of claim 8, wherein the structured data source includes a database.
10. The method of claim 1, wherein the selected patient information is a document and the links to related information refer to elements associated with the document.
11. The method of claim 1, wherein the selected patient information includes summary information.
12. The method of claim 1, wherein selectable patient information is presented based on a view.
13. The method of claim 12, wherein the view is based on one or more of a user identifier and a role.
14. The method of claim 12, wherein the selected patient information includes summary information.
15. The method of claim 12, wherein the selected patient information is sorted based upon relevance to one or more of a disease and a user.
16. A program storage device readable by a machine, tangibly embodying a program of instructions executable on the machine to perform method steps for browsing mined patient information, the method steps comprising:  
selecting patient information to view, at least some of the patient information being probabilistic;

presenting the selected patient information on a screen, the selected patient information including links to related information.

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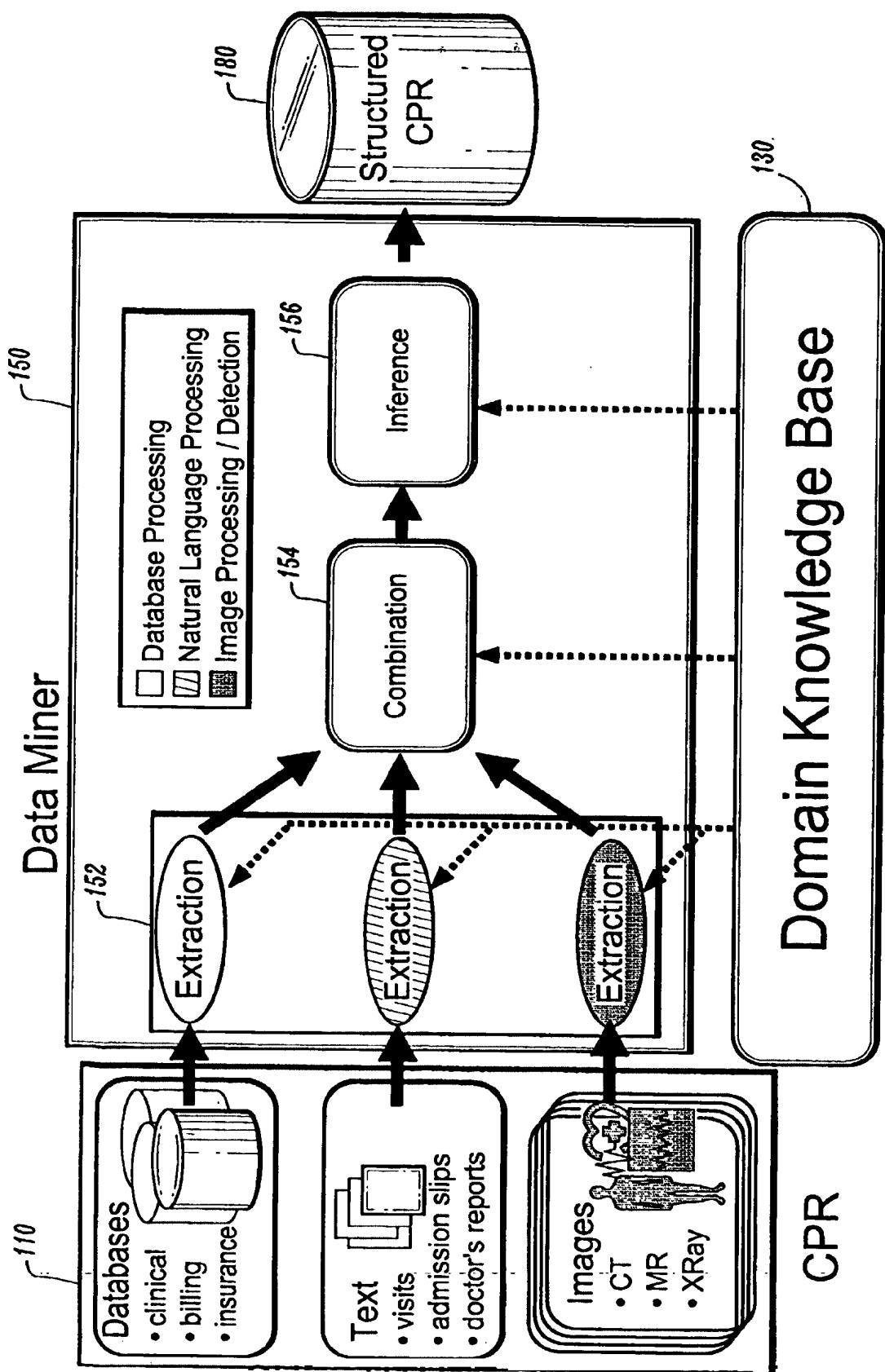
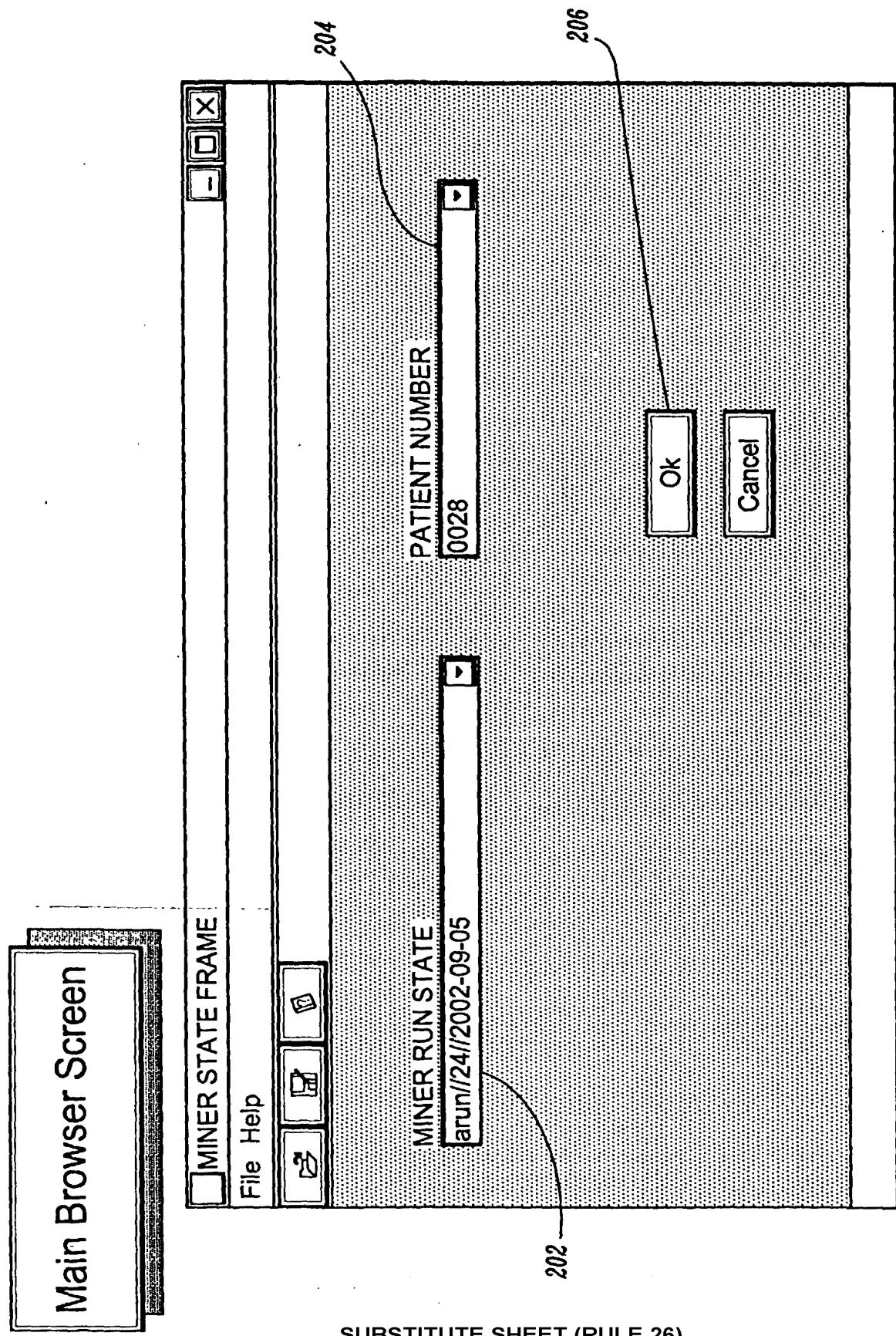


FIG. 1

**FIG. 2**

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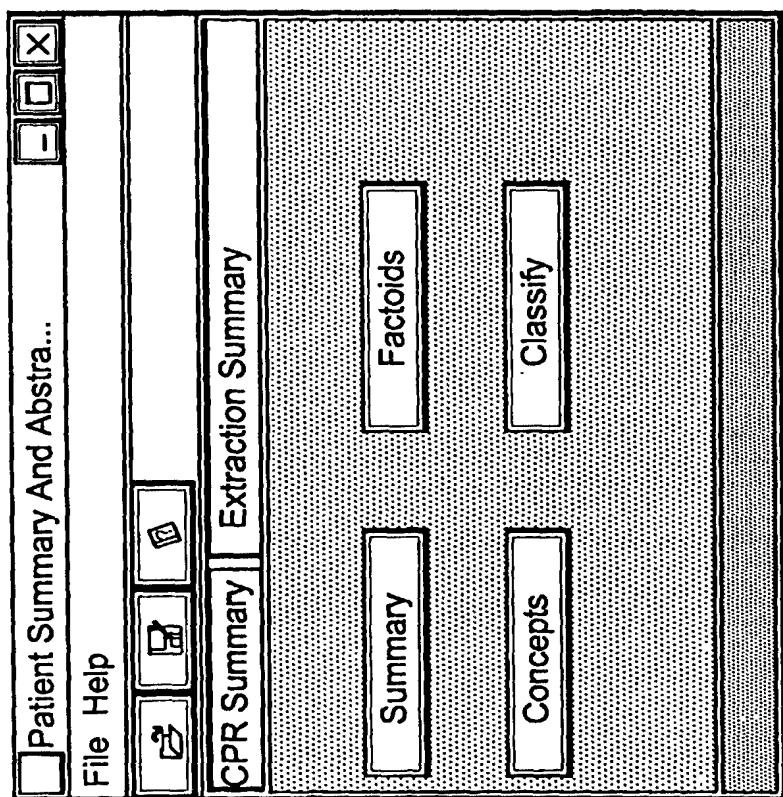


FIG. 3

300

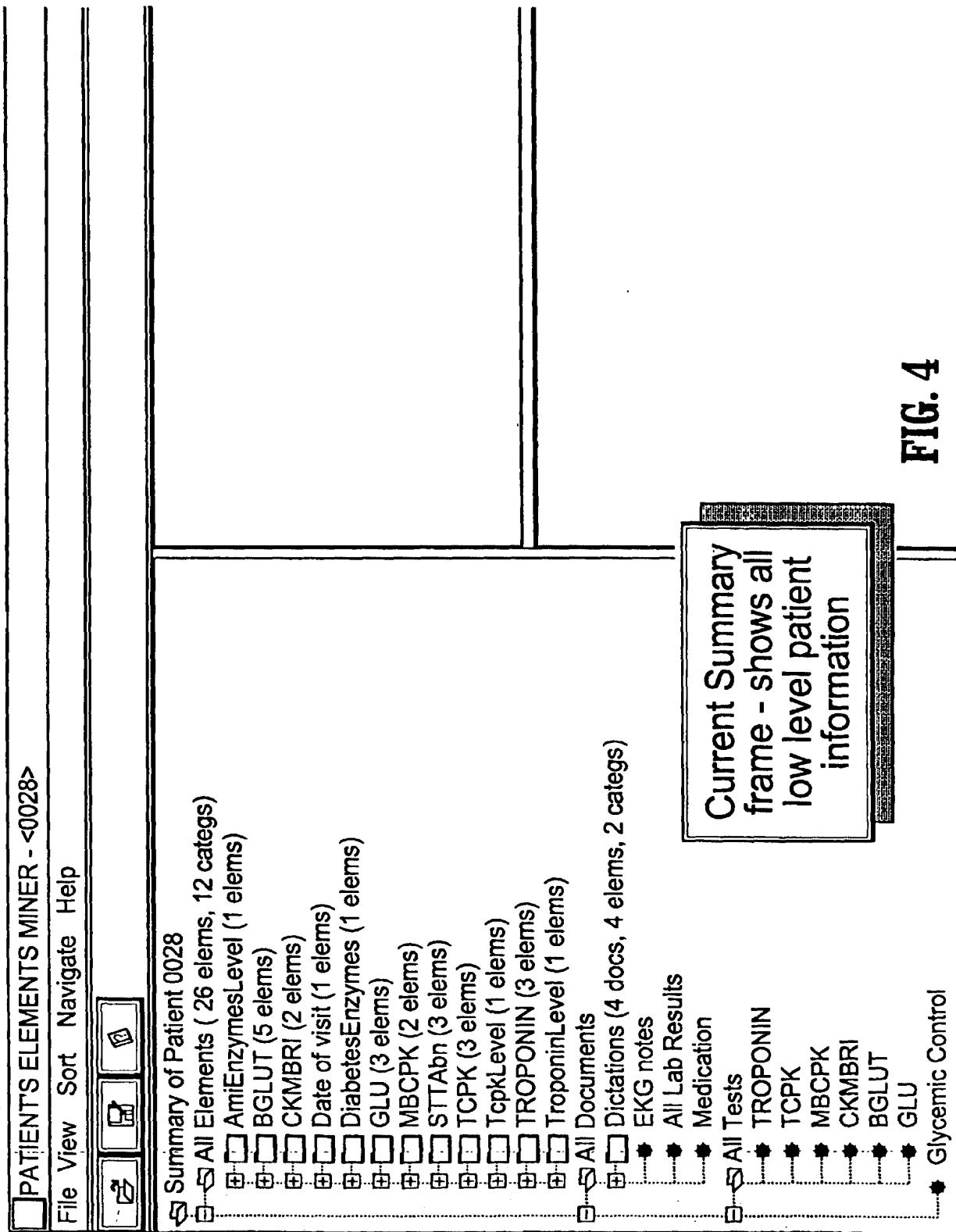


FIG. 4

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		<b>Summary of Patient 0028</b> <input checked="" type="checkbox"/> All Elements ( 26 elems, 12 categs ) <input type="checkbox"/> AmiEnzymesLevel (1 elems) <input type="checkbox"/> BGLUT (5 elems) <input type="checkbox"/> CKMBRI (2 elems) <input type="checkbox"/> Date of visit (1 elems) <input type="checkbox"/> DiabetesEnzymes (1 elems) <input type="checkbox"/> GLU (3 elems) <input type="checkbox"/> MBCPK (2 elems) <input checked="" type="checkbox"/> STTAbn (3 elems)																	
<b>(ST segment&amp;changes) : STTAbn,true,0.8,402</b>																			
<table border="1"> <tr> <th>Element</th> <th>STTAbn</th> <th>Value</th> <th>Date</th> </tr> <tr> <td>Element STTAbn</td> <td>Value: false</td> <td>0.71989997, true, 0.</td> <td></td> </tr> <tr> <td>Element STTAbn</td> <td>Value: true</td> <td>0.8</td> <td>Date: Thu Sep 21, 2000</td> </tr> <tr> <td>Element STTAbn</td> <td>Value: false</td> <td>0.71989997, true, 0.</td> <td>Date: Thu Sep 21, 2000</td> </tr> </table> <p>obtained; initial blood gas was pH 7.26, PCO2 of 48, PO2 352, and a bicarb of 21. Base excess was -6. Hemoglobin was 14, glucose 237, sodium of 137, and potassium of 3.6. I personally interpreted the films on this patient. Chest x-ray demonstrated a good ET tube position. Otherwise, it was negative for fracture and her C-spines were negative for any pneumothorax or widened mediastinum. Her pelvis was negative for fracture and her C-spines were not obtained in the department. A CT of the head revealed a subarachnoid hemorrhage which appeared to be consistent with a ruptured aneurysm. A CT of the abdomen was also obtained. Of note, during the patient's emergency department course, she received a total of 1000 cc of normal saline. She was also given morphine. EKG was obtained on this patient which was an inadequate study per my interpretation it reveals a sinus rhythm of 85 with normal intervals. There is very wavy baseline and I am unable to interpret inferior ST segment changes. The precordial leads are readable and I do not see any acute ST or T-waves changes. There is no ectopy on the EKG, but it is a substandard study and, therefore, will need to be repeated, but the patient is critically ill and, therefore, this was not done in the emergency department. The patient, after her CTs were obtained, was given Dilantin and Mannitol, and the patient was taken to CT angiography, the results of which are pending at the time of this dictation. The patient was transferred to 4-F and will be on the Trauma Service. Neurosurgery evaluate the patient in the emergency department and will follow the patient closely. The patient is admitted in critical condition to 4-F.</p> <p><b>DISCHARGE DIAGNOSES:</b></p> <ol style="list-style-type: none"> <li>1. SUBARACHNOID HEMORRHAGE.</li> <li>2. FACIAL LACERATION.</li> </ol> <p>**NAME&lt;UUU PPP&gt;, M.D. Dictated by: **NAME&lt;UUU PPP&gt;, M.D. MDMmg D: **DATE&lt;6/05/2001&gt; 07:16 T: **DATE&lt;6/05/2001&gt; 08:10 Job #: 19878</p> <p><b>FIG. 5</b></p>				Element	STTAbn	Value	Date	Element STTAbn	Value: false	0.71989997, true, 0.		Element STTAbn	Value: true	0.8	Date: Thu Sep 21, 2000	Element STTAbn	Value: false	0.71989997, true, 0.	Date: Thu Sep 21, 2000
Element	STTAbn	Value	Date																
Element STTAbn	Value: false	0.71989997, true, 0.																	
Element STTAbn	Value: true	0.8	Date: Thu Sep 21, 2000																
Element STTAbn	Value: false	0.71989997, true, 0.	Date: Thu Sep 21, 2000																

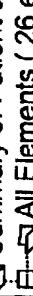
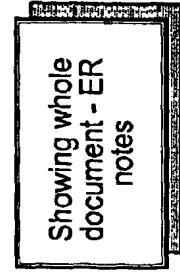
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<input type="checkbox"/> PATIENT'S ELEMENTS MINER - <0028> <input type="checkbox"/> File <input type="checkbox"/> View <input type="checkbox"/> Sort <input type="checkbox"/> Navigate <input type="checkbox"/> Help	<input type="checkbox"/> Summary of Patient 0028 <input type="checkbox"/> All Elements ( 26 elements, 12 categs) <input type="checkbox"/> AmEnzymesLevel (1 elements) <input type="checkbox"/> BGLUT (5 elements) <input type="checkbox"/> CKMBR (2 elements) <input type="checkbox"/> Date of visit (1 elements) <input type="checkbox"/> DiabetesEnzymes (1 elements) <input type="checkbox"/> GLU (3 elements) <input type="checkbox"/> MBCPK (2 elements) <input checked="" type="checkbox"/> STTAbn (3 elements)  <input type="checkbox"/> Element: STTAbn; Value: true; 0.8; Date: Thu Sep 21, 2006 10:59:59 AM	<p>(negative*STTAbn) : negation,true,0.9,402          (STsegment&amp;changes) : STTAbn,true,0.8,402</p> <p>obtained; initial blood gas was pH 7.26, pCO2 of 48, pO2 352, and a bicarb of 21. Base excess was -6. Hemoglobin was 14, glucose 237, sodium of 137, and potassium of 3.6. I personally interpreted the films on this patient. Chest x-ray demonstrated a good ET tube position. Otherwise, it was negative for any pneumothorax or widened mediastinum. Her pelvis was negative for fracture and her C-spines were not obtained in the department. A CT of the head revealed a subarachnoid hemorrhage which appeared to be consistent with a ruptured aneurysm. A CT of the abdomen was also obtained. Of note, during the patient's emergency department course, she received a total of 1000 cc of normal saline. She was also given morphine. EKG was obtained on this patient which was an inadequate study per my interpretation it reveals a sinus rhythm of 85 with normal intervals. There is very wavy baseline and I am unable to interpret inferior ST segment changes. The precordial leads are readable and do not show any ST segment changes. There is no ectopy on the EKG, but it is a substandard study and, therefore, will need to be repeated, but the patient is critically ill and, therefore, this was not done in the emergency department. The patient, after her CTs were obtained, was given Dilantin and Mannitol, and the patient was taken to CT angiography, the results of which are pending at the time of this dictation. The patient was transferred to 4-F and will be on the Trauma Service. Neurosurgery evaluated the patient in the emergency department and will follow the patient closely. The patient is admitted in critical condition to 4-F.</p> <p>DISCHARGE DIAGNOSES:</p> <ol style="list-style-type: none"> <li>1. SUBARACHNOID HEMORRHAGE.</li> <li>2. FACIAL LACERATION.</li> </ol> <p>**NAME&lt;UUU PPP&gt;, M.D.          Dictated by: **NAME&lt;UUU PPP&gt;, M.D.          MD:mig          D: **DATE&lt;6/05/2001&gt; 07:16          T: **DATE&lt;6/05/2001&gt; 08:10</p> <p>Element STTAbn          conflicting with          previous element</p> <p>All Documents  <input type="checkbox"/> Dictations (4 docs, 4 elements, 2 categs)  <input type="checkbox"/> EKG notes  <input type="checkbox"/> All Lab Results  <input type="checkbox"/> Medication    <input type="checkbox"/> All Tests  <input type="checkbox"/> TROPONIN  <input type="checkbox"/> TCPK  <input type="checkbox"/> MBCPK  <input type="checkbox"/> CKMBR  <input type="checkbox"/> BGLUT  <input type="checkbox"/> GLU    <input type="checkbox"/> Glycemic Control</p>
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FIG. 6

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FIG. 7

PATIENT'S ELEMENTS MINER - <0028>	
File	View
Sort	Navigate
Help	
  	
<b>Summary of Patient 0028</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> All Elements ( 26 elems, 12 categs)           <ul style="list-style-type: none"> <li><input type="checkbox"/> AmiEnzymes level (1 elems)</li> <li><input type="checkbox"/> BGLUT (5 elems)</li> <li><input type="checkbox"/> CKMBRI (2 elems)</li> <li><input type="checkbox"/> Date of visit (1 elems)</li> <li><input type="checkbox"/> DiabetesEnzymes (1 elems)</li> <li><input type="checkbox"/> GLU (3 elems)</li> <li><input type="checkbox"/> MBCPK (2 elems)</li> <li><input type="checkbox"/> STTAbn (3 elems)</li> <li><input type="checkbox"/> TCPK (3 elems)</li> <li><input type="checkbox"/> TcpkLevel (1 elems)</li> <li><input type="checkbox"/> TROPONIN (3 elems)</li> <li><input type="checkbox"/> TroponinLevel (1 elems)</li> </ul> </li> <li><input checked="" type="checkbox"/> All Documents           <ul style="list-style-type: none"> <li><input type="checkbox"/> Dictations (4 docs, 4 elems, 2 categs)               <ul style="list-style-type: none"> <li><input type="checkbox"/> Doc: HEADER 0 (1 elems, 1 categs)</li> <li><input type="checkbox"/> Doc: HEADER 1 (2 elems, 2 categs)</li> <li><input type="checkbox"/> Doc: HEADER 2 (3 elems, 3 categs)</li> <li><input type="checkbox"/> Doc: HEADER 3 (4 elems, 4 categs)</li> </ul> </li> <li><input type="checkbox"/> STTAbn (2 elems)</li> </ul> </li> <li><input type="checkbox"/> EKG notes           <ul style="list-style-type: none"> <li><input type="checkbox"/> Doc: ekg 10 (1 elems, 1 categs)</li> <li><input type="checkbox"/> Doc: DS 2 (0 elems, 0 categs)</li> </ul> </li> <li><input type="checkbox"/> All Lab Results           <ul style="list-style-type: none"> <li><input type="checkbox"/> TROPONIN</li> <li><input type="checkbox"/> TCPK</li> <li><input type="checkbox"/> MBCPK</li> <li><input type="checkbox"/> CKMBRI</li> <li><input type="checkbox"/> BGLUT</li> <li><input type="checkbox"/> GLU</li> </ul> </li> <li><input type="checkbox"/> All Tests           <ul style="list-style-type: none"> <li><input type="checkbox"/> Glycemic Control</li> </ul> </li> </ul>	
<b>**ER Notes (ER)</b> <b>***</b>	
<b>ATTENDING PHYSICIAN ADDENDUM:</b> <p>This is a Level I trauma who is brought by STAT MedEvac II Air Transport evaluated this patient with the trauma team. This is a Level I trauma who was an unrestrained driver involved in a roll-over car crash. Was initially unresponsive, but became responsive to deep sternal rub. Subsequently, during the transport, the patient became more somnolent and required endotracheal intubation just prior to landing. No other history is available, at this time.</p> <p>Physical examination: The patient arrives intubated, in full C-spine immobilization on a back board, in C1D and cervical collar. The patient is responding to some commands and moves her right foot to command on arrival. Vital signs during the primary survey were temperature 36.1, pulse 83, respirations 24 assisted, and blood pressure 90/10. EKG demonstrated a sinus rhythm. The airway was intubated. There were clear breath sounds bilaterally. Normal heart tones. No JVD or tracheal deviation. Symmetrical chest expansion without any crepitus or tenderness. GCS is 8T. The patient does obey commands on arrival. Pupils are 3 mm and briskly reactive bilaterally. TMs are clear bilaterally. Neck reveals no step-offs and there is no facial trauma. Abdomen is soft and nondistended; non tender. Rectal reveals normal tone and guaiac-negative. Pelvis is stable.</p>	
 <p>Showing whole document - ER notes</p>	

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□ PATIENT'S ELEMENTS MINER - <0005>

File View Sort Navigate Help

Summary of Patient 0005

- All Elements ( 89 elems, 20 categs)
  - ⊕ □ AmiEnzymesLevel (1 elems)
  - ⊕ □ BGLUT (38 elems)
  - ⊕ □ CKMBRI (1 elems)
  - ⊕ □ Date of visit (1 elems)
  - ⊕ □ Diabetes (5 elems)
  - ⊕ □ DiabetesDrugs (6 elems)
  - ⊕ □ DiabetesEnzymes (1 elems)
  - ⊕ □ DiabetesMedication (12 elems)
  - ⊕ □ DiabetesRuleFired (3 elems)
  - ⊕ □ GLU (5 elems)
  - ⊕ □ MBCPK (1 elems)
  - ⊕ □ Nephropathy (2 elems)
  - ⊕ □ Neuropathy (2 elems)
  - ⊕ □ pain (3 elems)
  - ⊕ □ Qwave (2 elems)
  - ⊕ □ STTAbn (2 elems)
  - ⊕ □ TCPK (1 elems)
  - ⊕ □ TcpkLevel (1 elems)
  - ⊕ □ TROPONIN (1 ELEMS)
  - ⊕ □ TroponinLevel (1 elems)
- All Documents
  - ⊕ □ Dictations (4 docs, 23 elems, 8 categs)
    - ⊕ □ Doc: HEADER 0 (1 elems, 1 categs)
    - ⊕ □ Doc: HP 1 (14 elems, 6 categs)
      - ⊕ □ Diabetes (3 elems)
      - ⊕ □ DiabetesDrugs (4 elems)
      - ⊕ □ Nephropathy (2 elems)
      - ⊕ □ Neuropathy (2 elems)
      - ⊕ □ pain (1 elems)
      - ⊕ □ Qwave (2 elems)
    - ⊕ □ Doc: ekg 10 (1 elems, 1 categs)
    - ⊕ □ Doc: HP 2 (7 elems, 4 categs)
  - EKG notes
  - All Lab Results
  - Medication
- All Tests
  - TROPONIN
  - TCPK
  - MBCPK
  - CKMBRI
  - BGLUT
  - GLU
  - Glycemic Control

List of all elements from document HP (different patient)

FIG 8

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File View Sort Navigate Help

Summary of Patient 0005

- >All Elements ( 89 elems, 20 categs)
  - AmiEnzymesLevel (1 elems)
  - BGLUT (38 elems)
  - CKMBRI (1 elems)
  - Date of visit (1 elems)
  - Diabetes (5 elems)
  - DiabetesDrugs (6 elems)
  - DiabetesEnzymes (1 elems)
  - DiabetesMedication (12 elems)
  - DiabetesRuleFired (3 elems)
  - GLU (5 elems)
  - MBCPK (1 elems)
  - Nephropathy (2 elems)
  - Neuropathy (2 elems)
  - pain (3 elems)
  - Qwave (2 elems)
  - STTAbn (2 elems)
  - TCPK (1 elems)
  - TcpkLevel (1 elems)
  - TROPONIN (1 ELEMS)
  - TroponinLevel (1 elems)
- All Documents
  - Dictations (4 docs, 23 elems, 8 categs)
    - Doc: HEADER 0 (1 elems, 1 categs)
    - Doc: HP 1 (14 elems, 6 categs)
      - Diabetes (3 elems)
      - DiabetesDrugs (4 elems)
      - Nephropathy (2 elems)
      - Neuropathy (2 elems)
      - pain (1 elems)
      - Qwave (2 elems)
    - Doc: ekg 10 (1 elems, 1 categs)
    - Doc: HP 2 (7 elems, 4 categs)
  - EKG notes
  - All Lab Results
  - Medication
- All Tests
  - TROPONIN
  - TCPK
  - MBCPK
  - CKMBRI
  - BGLUT
  - GLU
  - Glycemic Control

All Lab Results  
 -from  
 structured data  
 source

5,5 10/14/00 06:09 BGLUT 91
5,5 10/13/00 21:26 BGLUT 129
5,5 10/13/00 16:22 BGLUT 132
5,5 10/13/00 11:05 BGLUT 158
5,5 10/13/00 04:32 BGLUT 170
5,5 10/12/00 21:14 BGLUT 158
5,5 10/12/00 16:10 BGLUT 91
5,5 10/12/00 11:24 BGLUT 86
5,5 10/12/00 05:01 BGLUT 86
5,5 10/12/00 04:00 BGLUT 69
5,5 10/11/00 20:52 BGLUT 103
5,5 10/11/00 17:20 BGLUT 160
5,5 10/11/00 12:16 BGLUT 92
5,5 10/11/00 04:20 BGLUT 97
5,5 10/10/00 15:16 BGLUT 125
5,5 10/10/00 11:28 BGLUT 153
5,5 10/10/00 05:54 BGLUT 146
5,5 10/09/00 21:25 BGLUT 122
5,5 10/09/00 16:26 BGLUT 107
5,5 10/09/00 10:57 BGLUT 128
5,5 10/09/00 04:09 BGLUT 98
5,5 10/09/00 04:01 GLU 83
5,5 10/08/00 21:35 BGLUT 96
5,5 10/08/00 16:57 BGLUT 127
5,5 10/08/00 06:39 BGLUT 96
5,5 10/07/00 22:35 BGLUT 96
5,5 10/07/00 14:54 GLU 85
5,5 10/07/00 12:42 BGLUT 107
5,5 10/07/00 06:52 BGLUT 92
5,5 10/07/00 00:43 BGLUT 87
5,5 10/06/00 23:15 BGLUT 74
5,5 10/06/00 15:49 BGLUT 155

FIG. 9

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File View Sort Navigate Help

Summary of Patient 0005

All Elements ( 89 elems, 20 categs)

- AmiEnzymesLevel (1 elems)
- BGLUT (38 elems)
- CKMBRI (1 elems)
- Date of visit (1 elems)
- Diabetes (5 elems)
- DiabetesDrugs (6 elems)
- DiabetesEnzymes (1 elems)
- DiabetesMedication (12 elems)
- DiabetesRuleFired (3 elems)
- GLU (5 elems)
- MBCPK (1 elems)
- Nephropathy (2 elems)
- Neuropathy (2 elems)
- pain (3 elems)
- Qwave (2 elems)
- STTAbn (2 elems)
- TCPK (1 elems)
- TcpkLevel (1 elems)
- TROPONIN (1 ELEMS)
- TroponinLevel (1 elems)

All Documents

Dictations (4 docs, 23 elems, 8 categs)

- Doc: HEADER 0 (1 elems, 1 categs)
- Doc: HP 1 (14 elems, 6 categs)
  - Diabetes (3 elems)
  - DiabetesDrugs (4 elems)
  - Nephropathy (2 elems)
  - Neuropathy (2 elems)
  - pain (1 elems)
  - Qwave (2 elems)
- Doc: ekg 10 (1 elems, 1 categs)
- Doc: HP 2 (7 elems, 4 categs)

EKG notes

All Lab Results

Medication

All Tests

- TROPONIN
- TCPK
- MBCPK
- CKMBRI
- BGLUT
- GLU

Glycemic Control

All medications  
-from  
structured data  
source

Time span of medication: 10.0 days

Drug: ROSIGLITAZONE 8MG TAB  
Date: 10/3/00  
Doses: 1  
Price: 52.00

Drug: ROSIGLITAZONE 8MG TAB  
Date: 10/12/00  
Doses: 1  
Price: 52.00

Drug: ROSIGLITAZONE 8MG TAB  
Date: 10/11/00  
Doses: 1  
Price: 52.00

Drug: ROSIGLITAZONE 8MG TAB  
Date: 10/10/00  
Doses: 1  
Price: 52.00

Drug: HUMULIN 70/30 INSULIN 10 ML INJ  
Date: 10/10/00  
Doses: 1  
Price: 133.75

Drug: ROSIGLITAZONE 8MG TAB  
Date: 10/8/00  
Doses: 1  
Price: 52.00

Drug: HUMULIN 70/30 INSULIN 10 ML INJ  
Date: 10/8/00

FIG. 10

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Summary of Patient 0005		This test was performed 38 times	
<input checked="" type="checkbox"/>	All Elements ( 89 elems, 20 categs)		
<input type="checkbox"/>	AmiEnzymesLevel (1 elems)		
<input type="checkbox"/>	BGLUT (38 elems)		
<input type="checkbox"/>	CKMBRI (1 elems)		
<input type="checkbox"/>	Date of visit (1 elems)		
<input type="checkbox"/>	Diabetes (5 elems)		
<input type="checkbox"/>	DiabetesDrugs (6 elems)		
<input type="checkbox"/>	DiabetesEnzymes (1 elems)		
<input type="checkbox"/>	DiabetesMedication (12 elems)		
<input type="checkbox"/>	DiabetesRuleFired (3 elems)		
<input type="checkbox"/>	GLU (5 elems)		
<input type="checkbox"/>	MBCPK (1 elems)		
<input type="checkbox"/>	Nephropathy (2 elems)		
<input type="checkbox"/>	Neuropathy (2 elems)		
<input type="checkbox"/>	pain (3 elems)		
<input type="checkbox"/>	Qwave (2 elems)		
<input type="checkbox"/>	STTAbn (2 elems)		
<input type="checkbox"/>	TCPK (1 elems)		
<input type="checkbox"/>	TcpkLevel (1 elems)		
<input type="checkbox"/>	TROPONIN (1 ELEMS)		
<input type="checkbox"/>	TroponinLevel (1 elems)		
<input checked="" type="checkbox"/>	All Documents		
<input checked="" type="checkbox"/>	Dictations (4 docs, 23 elems, 8 categs)		
<input checked="" type="checkbox"/>	EKG notes		
<input checked="" type="checkbox"/>	All Lab Results		
<input checked="" type="checkbox"/>	Medication		
<input checked="" type="checkbox"/>	All Tests		
<input checked="" type="checkbox"/>	TROPONIN		
<input checked="" type="checkbox"/>	TCPK		
<input checked="" type="checkbox"/>	MBCPK		
<input checked="" type="checkbox"/>	CKMBRI		
<input checked="" type="checkbox"/>	BGLUT		
<input checked="" type="checkbox"/>	Glycemic Control		

FIG. 11

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  	<p><b>Summary of Patient 0005</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> All Elements (89 elems, 20 categs)</li> <li><input type="checkbox"/> AniEnzymesLevel (1 elems)</li> <li><input type="checkbox"/> BGLUT (38 elems)</li> <li><input type="checkbox"/> CKMBRI (1 elems)</li> <li><input type="checkbox"/> Date of visit (1 elems)</li> <li><input type="checkbox"/> Diabetes (5 elems)</li> <li><input type="checkbox"/> DiabetesDrugs (6 elems)</li> <li><input type="checkbox"/> DiabetesEnzymes (1 elems)</li> <li><input type="checkbox"/> DiabetesMedication (12 elems)</li> <li><input type="checkbox"/> DiabetesRuleFired (3 elems)</li> <li><input type="checkbox"/> GLU (5 elems)</li> <li><input type="checkbox"/> MBCPK (1 elems)</li> <li><input type="checkbox"/> Nephropathy (2 elems)</li> <li><input type="checkbox"/> Neuropathy (2 elems)</li> <li><input type="checkbox"/> pain (3 elems)</li> <li><input type="checkbox"/> Qwave (2 elems)</li> <li><input type="checkbox"/> STTAbn (2 elems)</li> <li><input type="checkbox"/> TCPK (1 elems)</li> <li><input type="checkbox"/> TcpkLevel (1 elems)</li> <li><input type="checkbox"/> TROPONIN (1 ELEM(S))</li> <li><input type="checkbox"/> TroponinLevel (1 elems)</li> <li><input checked="" type="checkbox"/> All Documents</li> <li><input checked="" type="checkbox"/> Dictations (4 docs, 23 elems, 8 categs)</li> <li><input type="checkbox"/> EKG notes</li> <li><input type="checkbox"/> All Lab Results</li> <li><input type="checkbox"/> Medication</li> <li><input checked="" type="checkbox"/> All Tests</li> <li><input checked="" type="checkbox"/> TROPONIN</li> <li><input checked="" type="checkbox"/> MBCPK</li> <li><input checked="" type="checkbox"/> CKMBRI</li> <li><input checked="" type="checkbox"/> BGLUT</li> <li><input checked="" type="checkbox"/> GLU</li> <li><input checked="" type="checkbox"/> Glycemic Control</li> </ul>	<p>This test was performed 1 times</p> <p>Initial Value = 191.0</p> <p>Minimum Value = 191.0</p> <p>Maximum Value = 191.0</p> <p>Average Value = 191.0</p> <p>Median Value = 191.0</p> <p>Test's time span: 0 days</p> <p>Interval 0 = (-inf, 3.0)</p> <p>Interval 1 = (3.0, inf)</p> <p>The values belong to the following intervals: 1</p> <p>The monotonicity of values: 191.0</p>
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**FIG. 12**

<input type="checkbox"/> Summary of Patient 0005 <input type="checkbox"/> <input checked="" type="checkbox"/> All Elements ( 89 elems, 20 categs) <input type="checkbox"/> <input checked="" type="checkbox"/> AmiEnzymesLevel (1 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> BGLUT (38 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> CKMBRI (1 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> Date of visit (1 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> Diabetes (5 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> DiabetesDrugs (6 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> DiabetesEnzymes (1 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> DiabetesMedication (12 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> DiabetesRuleFired (3 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> GLU (5 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> MBCPK (1 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> Nephropathy (2 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> Neuropathy (2 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> pain (3 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> Qwave (2 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> STTAbn (2 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> TCPK (1 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> TcpkLevel (1 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> TROPONIN (1 ELEM(S)) <input type="checkbox"/> <input checked="" type="checkbox"/> TroponinLevel (1 elems) <input type="checkbox"/> <input checked="" type="checkbox"/> All Documents <input type="checkbox"/> <input checked="" type="checkbox"/> Dictations (4 docs, 23 elems, 8 categs) <input type="checkbox"/> <input checked="" type="checkbox"/> EKG notes <input type="checkbox"/> <input checked="" type="checkbox"/> All Lab Results <input type="checkbox"/> <input checked="" type="checkbox"/> Medication <input type="checkbox"/> <input checked="" type="checkbox"/> All Tests <input type="checkbox"/> <input checked="" type="checkbox"/> TROPONIN <input type="checkbox"/> <input checked="" type="checkbox"/> TCPK <input type="checkbox"/> <input checked="" type="checkbox"/> MBCPK <input type="checkbox"/> <input checked="" type="checkbox"/> CKMBRI <input type="checkbox"/> <input checked="" type="checkbox"/> BGLUT <input type="checkbox"/> <input checked="" type="checkbox"/> GLU	
	patient id = 0005
	Date of event: Tue Oct 03 17:30:00 EDT 2000
	BGLUT tests over all time span: 38 Average BGLUT over all time span: 127.47369 Median BGLUT over all time span: 127.5
	GLU tests over all time span: 5 Average GLU over all time span: 101.4 Median GLU over all time span: 85.0
	BGLUT tests within 24 hrs of event: 0 Average BGLUT within 24 hrs of the event: 0.0 Median BGLUT within 24 hrs of the event: 0.0
	GLU tests within 24 hrs of event: 1 Average GLU within 24 hrs of the event: 147.0 Median GLU within 24 hrs of the event: 147.0
	Percentage of glucose values < 200 over all time span: 100.0% Percentage of glucose values < 200 within 24 hrs of the event: 100.0%
	Overall PEGC quality: Excellent Within 24 hrs PEGC quality: Excellent

**FIG. 13**

**Excellent**